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Memorandum

Date: **March 15, 2011**

To: **LaDonna Turner, Site Assessment Manager**
Technical and Enforcement Branch
U.S. Environmental Protection Agency, Region 6

From: **Dana Bahar, Manager**
New Mexico Environment Department, Ground Water Quality Bureau, Superfund Oversight Section

Subject: **Pre-CERCLIS Screening Assessment of the F-33 Mine Site, Ambrosia Lake Mining District, Cibola County, New Mexico: Further Investigation under CERCLA Recommended**

Site name	F-33 Mine (NM0057)	**Street address**	Not Applicable		
City	Not Applicable	**State**	New Mexico	**Zip code**	Not Applicable
County	Cibola County				
Latitude	35°12'59.25" N	**Longitude**	107°46'55.41" W		

Site physical description:
The F-33 Mine (Site) is located approximately six miles northeast of U.S. Interstate 40 near Grants, New Mexico (see Figure 1). The Site is situated on Bureau of Land Management (BLM) and private property, and access to the Site is through private property. The Site is characterized as a "dry" underground mine with dirt roads, concrete slabs for shops, service buildings, and ore storage, excavated entries to four portals/adits, and mine waste rock piles; the Site encompasses a total disturbed area of approximately 39 acres (which includes access roads and a soil borrow area). The Site is situated on the steep northwest slope of East Grants Ridge at an elevation of approximately 7,500 feet above mean sea level, and a small south-north trending arroyo/ephemeral stream is located approximately 0.1 miles below the Site on the northwest slope of the ridge.

Site identification:
The Site identification number is NM0057, according to the New Mexico Energy, Minerals and Natural Resources Department, Mining and Minerals Division (MMD) database. The Site is one of 97 legacy uranium mines identified within the Ambrosia Lake mining district of the Grants Mineral Belt. Historically, the F-33 Mine was also known under aliases such as "Section 33, Anaconda, Forest Group, and Head & Keely."

Site summary:
Based on Orin J. Anderson's observations (1980), a12-foot by 18-foot wooden frame building was onsite, and mine waste rock piles strewn with lumber and other debris were associated two adits driven into the Todilto limestone host rock.

According to Anderson (1980), scintillometer readings of approximately 3,500 counts per second (cps) were taken from mineralized limestone fragments in the mine waste rock pile associated with the primary adit. Across the Site, scintillometer readings ranged from 2,500 cps (at an opening in a steel plate door sealing off the primary adit) to a maximum of 10,000 cps (maximum needle deflection on the scintillometer) from mineralized limestone fragments in the mine waste rock pile associated with the secondary adit.

Based on field reconnaissance performed in September 2010 by MMD's contractor, Intera Incorporated (Intera), the mine site appeared to have been reclaimed and no buildings, shafts, declines, adits, or open cuts were observed at the Site. In addition, ore piles or waste rock piles were not observed onsite. Specific features that were observed onsite include a disturbed/bulldozed area (measuring approximately 200 feet wide by 300 feet long) consisting of soil/rock piles and graded areas. As part of the field observations, Intera conducted a radiological survey and recorded gamma radiation measurements at a background location and 11 survey locations along the access roads onsite. Measurements were taken at the ground surface and four feet above the ground surface at each survey point using a Ludlum 192 Ratemeter to record gamma radiation in micro Roentgen per hour (μR/hr).

The gamma radiation level at the background location (ground surface and 4-foot level) was 9 μR/hr. Overall, gamma radiation measurements ranged from a minimum of 7 μR/hr to a maximum of 170 μR/hr, and measurements taken at the 4-foot level indicated a maximum gamma radiation reading of 40 μR/hr. Three surface measurements exceeded the background level by a factor of three times (i.e. greater than 28 μR/hr), and one of these locations also exceeded 28 μR/hr at the 4-foot level. Gamma radiation readings at the surface and 4-foot level of the bulldozed area were 75 μR/hr and 22 μR/hr, respectively.

Atlantic Richfield Company (ARCO) and Homestake Mining Company of California completed reclamation of the Site in June 1994. Reclamation activities included: 1) Closure of the four mine openings by blasting and collapsing the mine openings. The openings were then further backfilled for permanent closure of the mine openings; 2) Consolidation and stabilization of the mining waste material; 3) Construction of drainage control features to insure protection of reclaimed areas; 4) Construction of 3:1 slopes on the waste piles and against the high walls to promote long term stability; 5) Filling and concrete capping of the mine vent raise; and 6) Demolition of building foundations and placement of this material and mining debris into waste dump areas.

Targets:
Based on a query of the New Mexico Office of the State Engineer (OSE), Water Rights Reporting System database, from a total of 97 well records (Table 1), there are 60 private/domestic wells within a 4-mile radius of the site (Figure 1). The nearest domestic well is approximately 1.5 miles from the Site; however, there is no residence associated with this well. The area surrounding the Site is predominately range land, and there are no municipal water supply wells within a 4-mile radius of the Site. The depth to ground water is approximately 115 feet below ground surface in a livestock water well located approximately 0.75 miles south of the Site (Table 1).

NMED Superfund Oversight Section (SOS) staff sampled a livestock well located approximately 1.5 miles north of the Site in March 2009. The ground water sampling results indicate that total dissolved solids, sulfate, and nitrate/nitrite exceed the New Mexico Water Quality Control Commission (NMWQCC) standards for these contaminants. In addition, dissolved uranium was detected at a concentration of 0.041 milligrams per liter (mg/L), which exceeds the NMWQCC standard (0.03 mg/L).

The surface water pathway has been evaluated and although drainage controls features were established as part of the reclamation activities, residual contamination could potentially migrate offsite via surface water runoff to a small southeast-northwest trending arroyo/ephemeral stream that is located approximately 0.1 miles below the Site on the northwest slope of Grants ridge.

Radiological surveys were conducted (as described in the site summary above) and used for the evaluation of the soil exposure pathway. Soil exposure from elevated radioactivity is limited (but not completely controlled) since access to the Site is through private property. No data acquisition was performed for the evaluation of an air pathway.

Site ownership and Potential Responsible Parties:
The Site is under private land ownership. Mining operations were conducted by Anaconda Company (acquired by ARCO in 1981) from 1951 to1959; by Farris Mines from 1961 to 1966; and Homestake Mining Company of California (HMC) from 1971 to 1977.

File review:
The references listed below were reviewed for the development of this pre-CERCLIS screen.

Site reconnaissance:
Orin J. Anderson of the New Mexico Bureau of Mines and Mineral Resources visited the Site in 1980. NMED Superfund Oversight Section personnel conducted field reconnaissance in October 2007. The historical F-33 Mine is only accessible via a private road that passes through a new proposed exploration area at the foot of the ridge; consequently, field observations and photographs of the Site were taken from a waypoint approximately 1.5 miles north on Forest Service Road 450 in the San Mateo Creek Basin (see Photographs 1 and 2). Intera Incorporated, a contractor to the New Mexico Energy, Minerals and Natural Resources Department, Mining and Minerals Division, visited the Site and conducted a radiological survey on September 16, 2010.

Recommendation:
Further investigation of the Site under CERCLA is recommended to assess any physical hazards as well as the areal extent of elevated radioactivity readings to determine if threats to human health and the environment exist.

Currently, the existence of regional impacts from legacy uranium sites to the ground water system has not been determined. Ground water impacts from “dry” mines such as this Site could potentially impact the alluvial ground water system through leaching of contaminants from waste rock piles. Furthermore, contaminants could potentially migrate offsite via surface water runoff to the small arroyo/ephemeral stream that originates below the Site, on the northwest slope of East Grants Ridge.

A comprehensive investigation of potential impacts to ground water from “dry” former uranium mines within the Grants Mining District is recommended as part of regional ground water quality characterization. Depending upon the results of this investigation, site-specific ground water characterization activities may be warranted.

References:
Anderson, Orin J., 1980, Abandoned or Inactive Mines in New Mexico. New Mexico Bureau of Mines and Mineral Resources, Open-file Report 148.

Atlantic Richfield Company (ARCO) and Homestake Mining Company (HMC), 1994, F-33 Mine Reclamation Report. August 1994.

New Mexico Energy, Minerals and Natural Resources Department, Mining and Minerals Division, October 2010, Abandoned Uranium Mine Site Assessment for the F-33 Site (NM0057), Final Report prepared by Intera Incorporated.

New Mexico Energy, Minerals and Natural Resources Department, Mining and Minerals Division, 2007, Abandoned and Inactive Uranium Mines Database.

New Mexico Environment Department, Superfund Oversight Section, 2010, Geochemical Analysis and Interpretation of Ground Water Data Collected as part of the Anaconda Company Bluewater Uranium Mill Site Investigation (CERCLIS ID NMD007106891) and San Mateo Creek Site Legacy Uranium Sites Investigation (CERCLIS ID NMN00060684), McKinley and Cibola County, New Mexico. Draft Released May 2010.

New Mexico Office of the State Engineer (OSE), 2010, New Mexico Water Rights Reporting System Database, Point of Diversion by Location, 4-mile Radius of F-33 Mine Site.

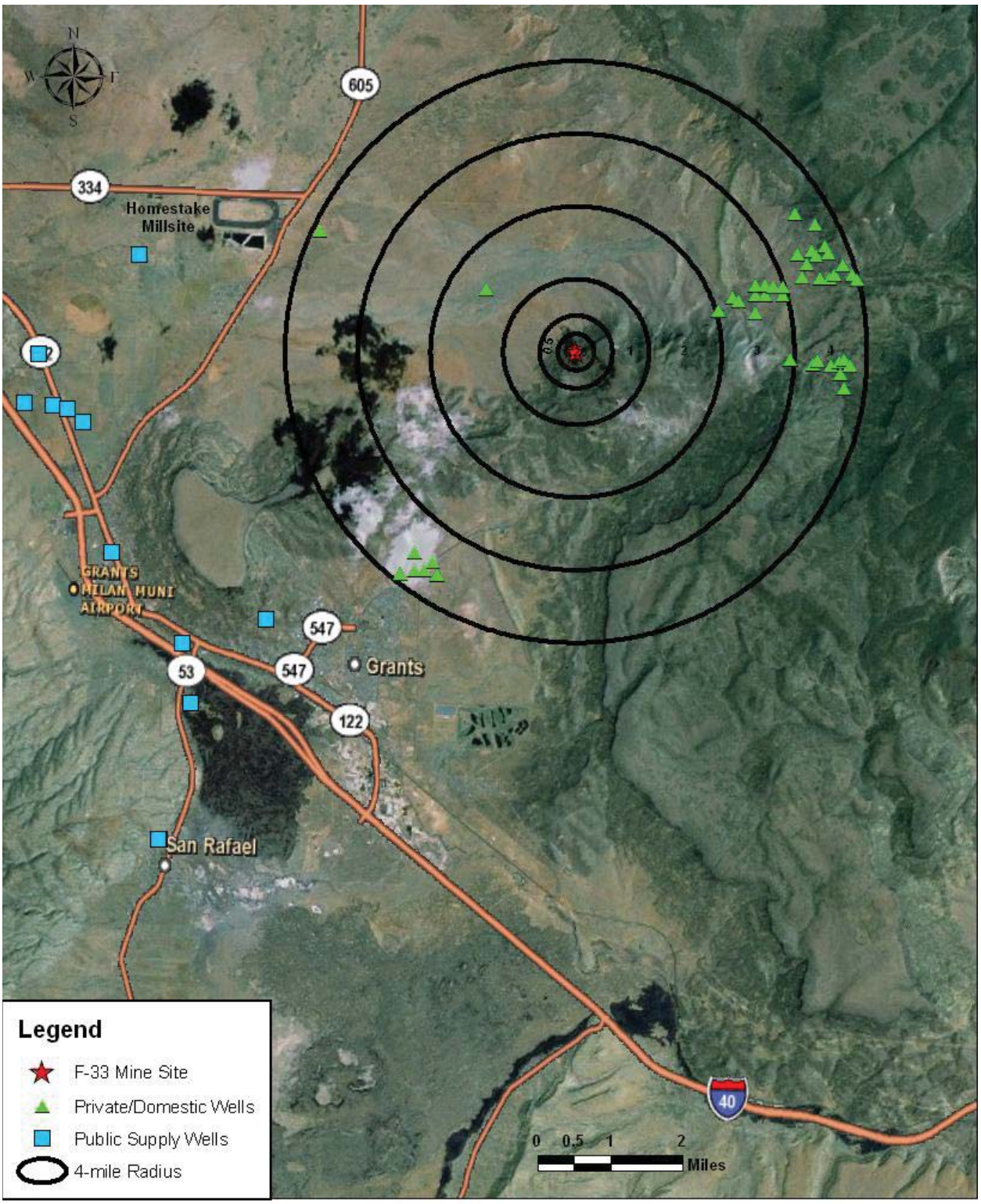

Figure 1: Wells within a 4-mile Radius of the Site (OSE 2010)

Table 1: All Records for Private Wells within a 4-mile Radius of the Site

Well Use (OSE Designation)[1]	Domestic & Livestock (DOL), Domestic-One Household (DOM), and Domestic-Muliple Households (MUL)[2]		Irrigation (IRR), Livestock (STK), and Sanitary/Commercial (SAN)		Exploration (EXP), and Monitoring (MON)		Other/Unassigned		Totals
Distance from Site (miles)	Number of wells	Water Level : Well Depth (Feet-BGS)	Number of wells	Water Level : Well Depth (Feet-BGS)	Number of wells	Water Level : Well Depth (Feet-BGS)	Number of wells	Water Level : Well Depth (Feet-BGS)	Number of wells
0 to 0.25	0	NA	0	NA	12	ND : 279-551	0	NA	12
0.25 to 0.5	0	NA	1	ND : ND	2	ND : 223-505	0	NA	3
0.5 to 1	0	NA	2	115 : 300	9	ND : 49-118	0	NA	11
1 - 2	1	42 : 142	2	70 : 160-450	0	NA	0	NA	3
2 - 3	17	50-200 : 120-220	1	ND : 750	0	NA	0	NA	18
3 - 4	42	58-300 : 98-605	4	140 : 240-273	2	32 : 85	2	62 : 215-400	50
Totals by Category	**60**		**10**		**25**		**2**		**97**

Footnotes:

[1] New Mexico Office of the State Engineer (OSE), 2010, New Mexico Water Rights Reporting System Database, Point of Diversion by Location

[2] Private/Domestic Wells shown on Figure 1.

ND No Data/Not Determined

NA Not Applicable

Photo 1: Southeast view toward the northwest slope of East Grants Ridge and the F-33 Mine Site that is reached via several switch-back turns on the access road that ascends the ridge.

Photo 2: Southeast view (zoomed-in) toward the F-33 Mine Site near the top of East Grants Ridge.